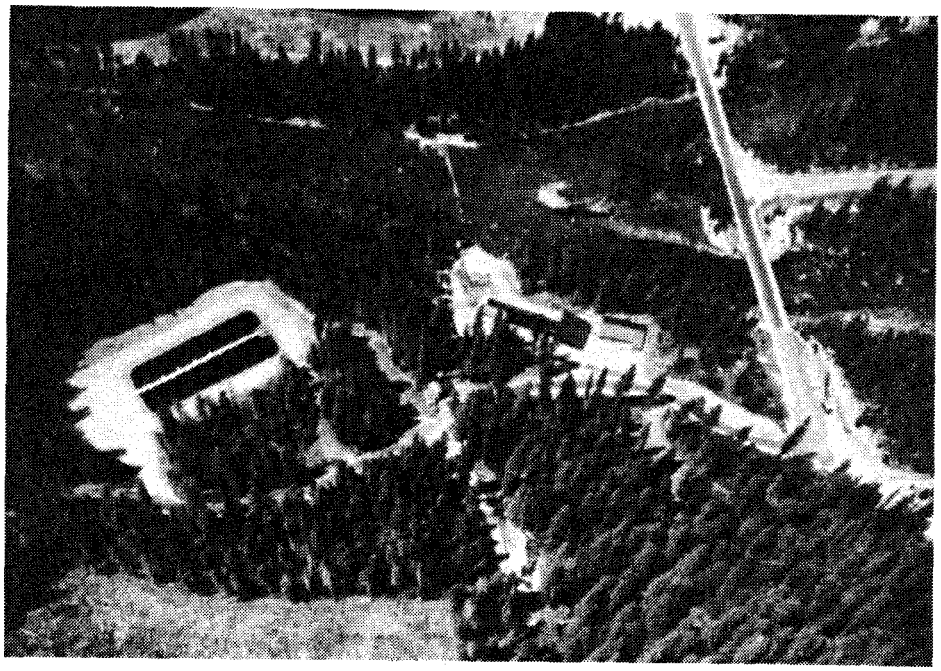
CLEARWATER HATCHERY

1988 Chinook Brood Year Report

Red River and Powell Facilities



by

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August 1991

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ABSTRACT

Red River and Powell chinook stations are satellite facilities of the Clearwater Hatchery. Clearwater Hatchery is planned to be in operation in the spring of 1992 and is part of the U.S. Fish and Wildlife Lower Snake River Compensation Plan. The mitigation goal is to return 12,000 adult spring chinook and 14,000 adult steelhead above Lower Granite Dam. Red River was built in 1974 by the Columbia River Project and then remodeled by the Army Corps of Engineers in 1986. Construction of Powell was started in spring of 1988 and completed in fall of 1989. The first rearing cycle at the new Powell facility started in June 1989.

Red River is designed to trap and hold 500 adult chinook salmon. Rearing capacity is up to 350,000 chinook smolts.

Powell is designed to trap and hold 1,000 adult chinook salmon. Rearing capacity is up to 450,000 chinook smolts.

A total of 391 adults and 3 jacks were trapped at Red River in 1988. Of the 209 females trapped, 84 were used for *spawning.* A total of 391,750 eggs were taken. The eggs were taken to Kooskia hatchery to eye-up. these fish experienced an outbreak of Ich in late august. The production of 240,500 smolts used 8,550 pounds of feed for a conversion of 1.87 pounds of feed per pound of fish gain.

Powell fish were progeny of Dworshak fish. They were eyed and hatched at Dworshak Hatchery and then transferred to Kooskia Hatchery. In June 1989, 315,900 were transferred to Powell. The production of 314,500 smolts used 11,750 pounds of feed for a conversion of 0.85 pounds of feed per pound of fish gain.

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OBJECTIVES

The objectives of the Clearwater Fish Hatchery satellite facilities are:

1. Return 12,000 adult spring chinook and 14,000 adult steelhead above Lower Granite Dam.

2. Trap and spawn adults returning to these facilities.

3. Acclimate and rear spring chinook smolts for release in the upper Clearwater River tributaries.

STAFFING

The permanent employee staff consists of one Hatchery Superintendent III to manage the facilities. In addition, there are five seasonal employees. Two of the seasonal employees are bio-aides, two are laborers, one of each to operate each facility, and the other is a YCC employee used for bookkeeping and odd jobs.

RED RIVER FACILITY

Hatchery Description

The Red River facility is part of the Lower Snake Compensation Plan. This facility has been in operation since June 1987. Goals for Red River are to trap adult chinook salmon for spawning and rear 300,000 juvenile chinook salmon.

Red River operates on water from the South Fork of Red River. An intake structure is located near Red River Ranger Station. The river provides up to 6 cfs of water at high flow. During low flow, total volume is 3 cfs to be split between the rearing pond and adult ponds. Water temperatures range from 38°F to 68°F .

red River facility consists of an earthen rearing pond that measures 270 ft wide x 330 ft long x 4 ft deep. A catwalk extends 3/4 of the was across the pond and holds seven Nielsen OMP feeders. The feeders are controlled by a time clock that operates the feeders for 15 seconds once every hour. A storage building and walk-in freezer are located near the upper end of the rearing pond. The adult facility has removable tripod and panel weir, fish ladder, trap area, and two adult ponds 40 ft x 10 ft x 4.25 ft. A 25 ft x 25 ft support cabin and 12 ft x 14 ft storage shed are located near the adult ponds.

1988 Spring Chinook Returns

The 1988 jack returns were from 98,000 smolts released in the spring of 1987 and 96,400 released in the fall of 1986. Four-year-old adults returned from 136,800 smolts released in the spring of 1986. Five-year-old adults returned from 80,000 smolts released in the spring of 1985 (Table 1).

Tripods and panels were put into place May 24 and 25. At this time, the fish ladder and trap were charged with water. Center pickets were not installed in the weir panels until June 9 due to high water. The first fish was trapped on June 10 (Figure 1). We trapped a total of 391 adults and 3 jacks. We released 75 females, 81 adult males, and 2 jacks to spawn naturally. One hundred thirty-four females, 101 adult males, and 1 jack were ponded. The trap wa shut down and the weir removed on September 13. All adults held for spawning were injected with erythromycin phosphate at a rate of 1/2 cc per 10 pounds of fish body weight.

Age classification was done using length data according to the following: jacks 64 cm (25 inches) or less, four-year-olds 64 cm to 82 cm (32 inches), and five-year-olds 82 cm or over (Table 2). A total of 394 spring chinook were trapped; 3 jacks, 132 four-year-olds, and 259 five-year-olds (Figure 2).

Coded Wire Tag Recoveries

All chinook trapped were examined for fin clips and jaw tags. No fish with these marks were released above the weir (Table 3).

Prespawning Mortality

Prespawning mortality included all females which died before spawning and males that died through the second week of spawning. There were 236 adults ponded; 50 females and 32 males were lost to prespawning mortality, approximately 34.7%.

Chinook Spawning

Spawning activities began on August 9, 1988 and concluded September 8, 1988. During seven spawning sessions, 312,000 green eggs were taken. The eggs were transported to Kooskia National Hatchery to eye-up. All eggs were water-hardened for one hour in 200 ppm iodine solution before transportation.

At the time of spawning, the crew also took samples for disease assays. Eighty-one females and 35 males were tested for IPN, IHN, and BKD. Seventeen females were positive for IHN virus; no males were positive. All samples were

Table 1. Red River smolt release and adult returns.

Brood year	Release near	Number released	Jacks	Adult returns 2-ocean	Adult returns 3-ocean	Total	%
1982	1983 fall	260,000					
	1984 spring	40,000	2	[a]	107	n/a	n/a
1983	1985 spring[b]	80,000	[a]	377	259	636	.795
1984	1986 spring[b]	136,000	35	132	74	241	.176
1985	1986 fall[a]	96,400°	3	25			
	1987 spring	98,800°					
1986	1987 fall	233,100	5				
1987	1988 fall	291,200					
1988	1989 fall	240,500					

[a]Trap was not installed in 1986 due to construction at facility.
[b]These fish over-wintered in the rearing pond. These fish were Rapid River stock reared at Sawtooth Hatchery.

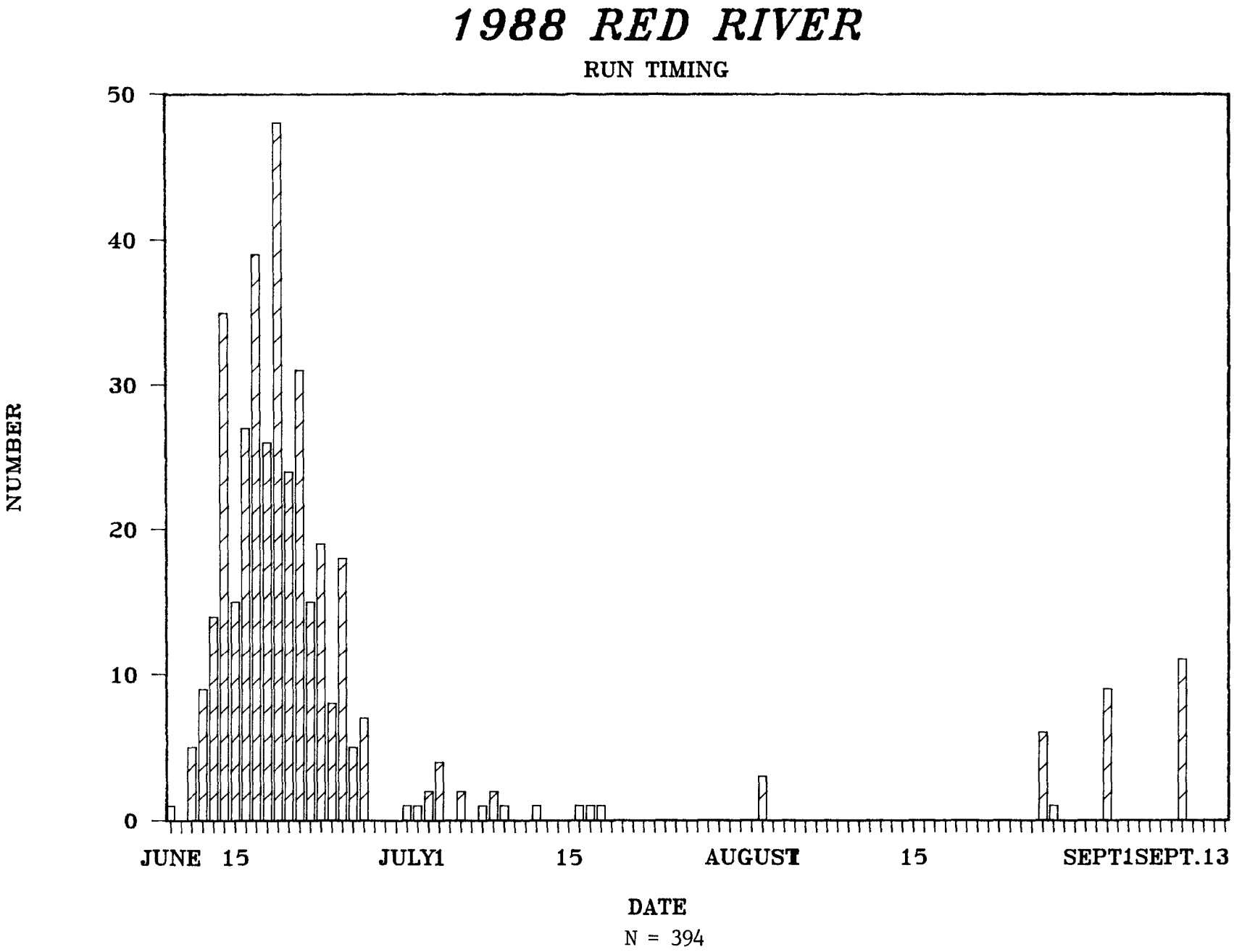

Figure 1. Red River Run Timing.

Table 2. Summary of fish trapped, released, and spawned.

TOTAL FISH TRAPPED: 394

		FEMALES	MALES
AGE CLASSES	3-year-olds:	0	3
	4-year-olds:	75	57
	5-year-olds:	134	125

FISH DISPOSITION FEMALES:

Spawned:	84
Released:	75
Mortality:	50
Total:	209

FISH DISPOSITION MALES:

Spawned:	84
Released:	81 adults, 2 jacks = 83
Mortality:	54 (includes 36 fish also spawned)
Total:	185

AGE CLASS:

3-year-olds = <64 cm
4-year-olds = 65 to 82 cm
5-year-olds = >82 cm

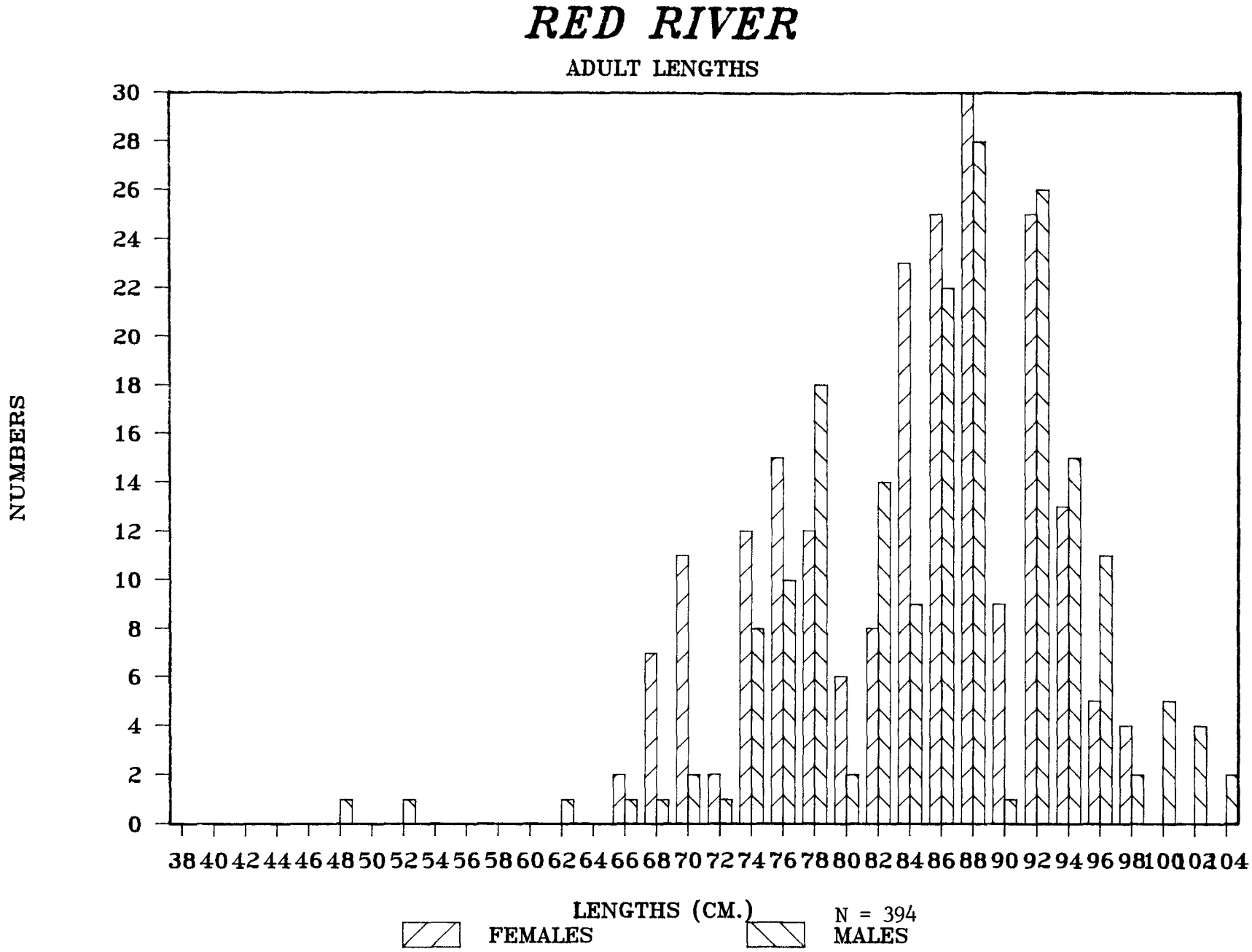

Figure 2. Red River Length Frequencies.

Table 3. Tag code for coded wire tagged fish returning to Red River in 1988.

Tag code	Brood year	Release year	Tags released	Tags recovered	Group released
23-19-16	1984	fall 1985	5,000	1	a

negative for IPN virus. Twenty-five samples were positive for BKD; these were not kept separate by sex. Results were 20% IHN+ and 30% BKD+.

Carcass Disposition

All spawned-out carcasses and pond mortalities were disposed of by Walco Sanitation Service of Grangeville.

Chinook Fingerlings

One June 1 and 2, 1989, 309,360 chinook fingerlings at 136/lb were hauled from Dworshak Hatchery to Red River Pond. We transported these fish in three loads using Idaho Department of Fish and Game adult tankers. Fingerlings were fed 1/16-inch OMP4 for 2 weeks, then a 50-50 mix of 1/6-inch and 3/32-inch OMP4 for 1 week. Next, 100% 3/32-inch pellet was fed until the fish were 50 fish/lb. Then a 50-50 mix of 3/32-inch OMP4 and 1/8-inch OMPII for 1 week. they were then fed 100% 1/8-inch OMP4 until release. Feeding rates were adjusted through the rearing period (Table 4). They were also fed erythromycin medicated feed twice during the rearing season. The first treatment was immediately after stocking into the pond. The second treatment was in September. Both treatments were for 21 days at a level of 1.4% body weight and a rate of 41 grams of TM50 per 100 lbs of fish. These fish experienced an outbreak of Ich that started about August 12 and peaked about August 17. We tried one treatment using 250 gallons of formalin. We pumped this from barrels setting on a truck through 200 feet of garden hose that was attached to the stern of a row boat. This treatment gave no noticeable results. We then treated twice with Potassium Permanganate at a rate of .5 ppm. This treatment gave better results for reducing the number of Ich parasites on the gills. The second and final Potassium treatment was on August 28. Shortly after this, the water temperature dropped and mortalities dropped drastically. Total mortalities were impossible to count because of the size of the pond (2.24 acres). We collected approximately 64,800.

Proper treatment of this pond was impossible. The turnover rate was about 25 hours. Treatments had to be administered out of the back of a row boat while rowing around the pond. There were extreme hot and cold spots during this treatment. My recommendation would be to reduce the size of this pond to approximately 165 ft x 65 ft x 5 ft. This would give a turnover rate conducive to treatment of fish diseases.

Chinook Smolts

Chinook smolts were released from the pond on October 18, 1989. Approximately 240,513 smolts were released at 35 fish/lb and 4.25 inches long. The roller screen and half of the dam boards were removed in one day. The remaining boards were removed over a 3-day period. There were no fish stranded

Table 4. Conversion rates, monthly total length at end of month, percent body weight fed, and average monthly water temperature.

Month	Conversion	Total lenqth (in)	% Body weiqht	Water Temp (°F)
		RED RIVER		
Jun	1.25	3.30	1.4	52
Jul	1.16	4.02	1.8	62
Aug	4.53	4.80	.078	60
Sep	1.71	4.21	1.1	50
Oct	-gain	4.25	0.4	42
		POWELL		
Jun	3.03	3.49	1.4	49
Jul	1.29	3.98	1.8	56
Aug	1.16	4.41	1.0	54
Sep	0.50	4.80	1.1	46
Oct	0.87	5.16	0.4	39

on the pond bottom. This is the best routine for releasing fish from this pond. No fish were coded wire tagged or branded this year due to poor fish health related to an Ich outbreak and a reaction related to the feeding of erythromycin medicated feed. This reaction from the medicated feed was expressed by a violent fright-like response. The fish had been off the medicated feed for about 14 days. When they were netted for a routine pound count, they reacted so violently that some fish died immediately. These fish were in complete tetany. The muscle spasms were so violent some of the fish were bent into a "C" shape nose to tail. Given the water chemistry of Red River, these fish should be taken off of erythromycin medicated feed no less than 30 days prior to coded wire tag operations.

Survival to Release

Total survival from green egg to smolt is not available for Brood Year 1988 because Dworshak stock were added to the Red River stock. Table 5 shows all information available.

Survival from transportation to Red River Pond until release was 77.4%.

POWELL FACILITY

Hatchery Description

The Powell facility is part of the Lower Snake River Compensation Plan. This facility was completed in October 1989. Goals for Powell are to trap adult chinook for spawning and rear up to 550,000 juveniles to pre-smolt.

This facility has two water sources; a gravity flow from Walton Creek and a pump station from the Lochsa river. Water flow from Walton Creek ranges from 3 to 5 cfs. The pump station has a capacity of 3 cfs. Water temperature ranges from 33°F to 59°F.

Powell rearing facility consists of a 160 ft long x 65 ft wide x 7 ft deep pond. The construction of this pond is rather unique. The first layer is compacted gravel. The second layer is 4 inches of concrete-enriched earth. Thirdly, a poly liner is bolted and clamped to a concrete gutter in the center of the pond bottom. Fourth, a 3/16-inch thick felt liner is laid down to protect the poly liner from punctures. The final layer is different on the sides and bottom. The bottom is 10 inches of 1/2- to 1-inch diameter gravel. The sides are lined with one layer of 8- to 12-inch diameter rock. There is a center walkway the full length of the pond. Eight OMP Nielsen automatic feeders are suspended from the edge of the walkway. The feeders are controlled by an adjustable timer. Maximum loading of this pond would be 500,000 chinook smolts.

Table 5. Brood Year 1988 spring chinook survival from green eggs to release.

Green eggs	Eyed eggs	Percent eye-up	swim up	swim-up %	Number released	Release %
366,743	263,250	72.8	[a]	[a]	[a]	a

[a]This information is not available because Dworshak stock were added to these fish upon transportation to Red River.

The adult holding facility has a capacity of 1,000 adults. It consists of two ponds 100 ft long x 12 ft wide x 5 ft deep. A spawning bay is attached to the holding pond area.

The floating weir spans the entire Lochsa River at the confluence of White Sands Creek and Crooked Fork. The weir is secured by hooks imbedded in a concrete sill across the river bottom. Fish are diverted to Walton Creek where they swim into the fish ladder and trap.

A support cabin and shop area are located beside the adult facility. The cabin has a living room, dining area, kitchen, and one bedroom. the shop includes a work bench and work area, electrical controls for the entire facility, and a 10 ft wide x 12 ft long x 6 ft tall walk-in freezer.

Spring Chinook Returns

The Powell trapping facility was not operated in 1988. This was the first year of construction. All trapping and spawning was performed at Dworshak National Fish Hatchery. The coded wire tag recoveries and prespawning mortality, along with spawning and carcass disposition, was also recorded by Dworshak National Fish Hatchery.

Chinook Fingerlings

The eggs were incubated at Dworshak Hatchery. The fry were started on feed in the inside vats at Dworshak and were then transported to Kooskia National Fish Hatchery and reared to approximately 90 fish/lb. On June 5, 315,900 fingerlings were transported to Powell using a Idaho Department of Fish and Game adult tanker. Fingerlings were fed 1/6-inch OMP4 for 2 weeks, then a 50-50 mix of 1/16-inch and 3/32-inch OMP4 for 1 week. Next, 100% 3/32-inch pellet was fed until the fish were 50/lb. Then a 50-50 mix of 3/32-inch and 1/8-inch OMP4 for one week. They were then fed 100% 1/8-inch OMP4 until release. They were also fed erythromycin medicated feed twice during the rearing season. The first treatment was immediately after stocking into the pond. The second treatment started the last week of August. Both treatments were for 21 days and fed at a rate of 1/4% body weight and a rate of 41 grams of TM50 per 100 pounds of fish.

Chinook Smolts

Chinook smolts were released from the pond beginning on October 19. The screens were removed and fish allowed to leave on their own. On October 20, all of the boards were removed over a 2-hour period. The smolts were flushed from he pond. No fish were stranded on the pond bottom. Approximately 324,500 smolts were released at 18 fish/lb and 5.16 inches. There was a 99% survival from initial ponding to release. No fish were coded wire tagged or freeze branded

due to a stress reaction related to the erythromycin treatments. This stress reaction was more violent the reaction seen during this sam time at Red River (see Red River section). I recommend a 30-day break between feeding erythromycin medicated feed and coded wire tag operations. Fish reared at Powell also received two treatments of medicated feed. Each treatment was for 21 days and fed at a level of 1.4% body weight and a rate of 41 grams of TM50 per 100 pounds of fish.

Survival to Release

Total survival from green egg to smolt is not available for the 1988 Brood Year. The fingerlings used at Powell were from excess fish held at Kooskia National Fish Hatchery. Survival from transportation to Powell to release was **99.6%.**

PRODUCTION COSTS

The total budget cost to produce the 1988 Brood Year presmolts at Powell and Red River was $191,000. There was a total of 18,487 pounds of body weight gain. Production cost of these fish was $10.33 per pound of fish. See Table 6 for cost per pound of feed used.

Table 6. Production costs for 1988 Brood Year at Red River and Powell.

Location	Red River	Powell
Weight gain	4,564	13,923
Pounds of feed fed	8,550	11,750
Cost of feed	$4,678	$5,875
Conversion	1.87	0.85
Feed cost per pound of gain	$1.03	$.42

Combined total budget	$191,000

A P P E N D I X

Appendix 1. Red River length frequencies.

Length (cm)	Females	Males
38	0	0
40	0	0
42	0	0
44	0	0
46	0	0
48	0	1
50	0	0
52	0	1
54	0	0
56	0	0
58	0	0
60	0	0
62	0	1
64	0	0
66	2	1
68	7	1
70	11	2
72	2	1
74	12	8
76	15	10
78	12	18
80	6	2
82	8	14
84	23	9
86	25	22
88	30	28
90	9	1
92	25	26
94	13	15
96	5	11
98	4	2
100	0	5
102	0	4
104	0	2
Total	209	185

88TABLS

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